



RIDGE

TECHNICAL NOTE 2

LAND SOUTH OF LONGFIELD ROAD
21/05/2026

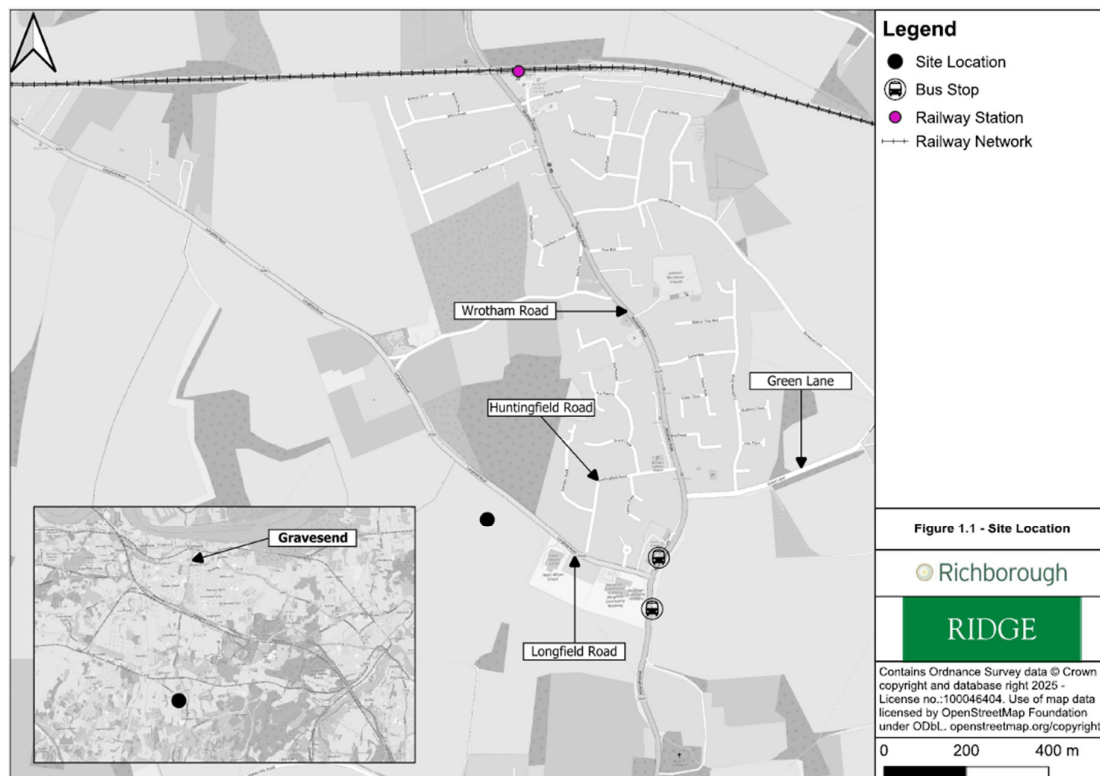
TECHNICAL NOTE 2

PROJECT	LAND SOUTH OF LONGFIELD ROAD
PROJECT NO.	T25526
CLIENT	RICHBOROUGH
DATE	21/05/2026
SUBJECT	A2/WROTHAM ROAD SENSITIVITY ASSESSMENT
PREPARED BY	MJ
REVIEWED BY	GM

1. INTRODUCTION

- 1.1.1. Ridge and Partners LLP (formerly Hub Transport Planning Ltd) has been commissioned by the client, Richborough, to provide transport advice for a proposed residential development on land south of Longfield Road, Meopham, Kent.
- 1.1.2. The proposed development is for up to 120 dwellings and has been submitted as part of an outline planning application with all matters reserved except for details of access to the site. Approval is sought for the principal means of vehicular access from Longfield Road, and all other matters reserved. The site location is shown on Figure 1.

Figure 1 - Site Location



- 1.1.3. This technical note provides a sensitivity assessment for National Highways (NH), as custodians of the Strategic Highway Network (SRN), to demonstrate the potential level of impact of the proposed development on the A2/Wrotham Road double roundabout junction.

2. BACKGROUND INFORMATION

- 2.1.1. An interim Transport Assessment (TA) was submitted to Kent County Council (KCC) in September 2025 whilst strategic modelling work was being carried out by KCC's consultants, Jacobs.
- 2.1.2. It was agreed with KCC that the Gravesham Transport Model (GTM) should be used to distribute and assign development traffic, utilising the turning flow outputs to assess local junction capacities. It was agreed with KCC that a suitable threshold for assessment would be those junctions that experience an increase of 30 two-way development trips from across both developments.
- 2.1.3. NH provided a response to the interim TA (NH Ref:25/13746) on 26th February 2026 recommending that planning permission not be granted for a specified period. The comments are summarised as follows and included at Appendix A.
- Requested that distribution and traffic flows were presented prior to assessment and noted that the Wrotham Road/A2 junction is sensitive to flow changes.
 - Applicant to agree committed development with the LPA and provide the information to NH for review.
 - Full details of TEMPro factors derived.
 - Until trip generation, distribution and assignment are agreed, National Highways are unable to confirm the need for, or extent of SRN assessment required.
 - Likely to recommend a Construction Environmental Management Plan (CEMP) to be secured via planning condition.
- 2.1.4. The GTM turning flow data was received from Jacobs on 6th March 2026 and were used to assess the agreed local junctions for the relevant scenarios included within the GTM.
- 2.1.5. Following review and processing of the data, this was provided to NH on 8th April 2026. The revised TA with modelling work was submitted to KCC on 27th April 2026 prior to a response being received from NH, however one was subsequently provided on 29th April 2026. The full response is provided at Appendix B.
- 2.1.6. In summary NH, stated the following:
- Request to see the change in overall flows for the study area, particularly along the A2 as well as the impacts of the developments on the junction operation.
 - An independent high level distribution assessment was undertaken using Census 2011 Method of Travel to Work data which shows a greater number of vehicles traveling towards the A2/Wrotham Road junction and towards the M20. Therefore, NH requested the modelling brief to be provided to understand the methodology used to distribute and assign traffic within the strategic model, in addition to the forecast model reports.
 - Acknowledge that the A2/Wrotham Road junction is currently operating under congested conditions during the evening peak hour at the southern roundabout with queueing traffic on the A2 westbound off slip. There are two committed mitigation schemes for the southern roundabout, these being:
 - 'Interim' Mitigation Scheme proposed under planning application ref: 20240856 (Former Tollgate Hotel); and,
 - 'Final' Mitigation Scheme proposed under planning application ref: 20141214 (Land at Coldharbour Road).

- An assessment of the A2/Wrotham Road junction will be required and should be based on a calibrated and validated model.
 - Any assessment should include the two committed schemes within the relevant scenarios and be compliant with the guidance set out in DfT Circular 01/2022.
 - Recommend that once the full extent of the SRN assessment has been agreed, the applicant should seek an up-to-date list of committed developments and details of committed schemes from the LPA.
 - Depending upon distribution, a merge and diverge assessment may be requested.
 - Collision data analysis to be provided on any SRN junction assessed.
- 2.1.7. Further information has been requested from Jacobs including assumptions on distribution and committed developments. At the time of writing this information has not yet been received. Once received the data will be considered and provided to NH for comment.
- 2.1.8. The link and junction validation details of the GTM model are not available to Ridge. In other words, we are not aware that queuing observations were undertaken at the A2/Wrotham Road junction to validate the specific turning flow predictions in the model. In order to validate and, if necessary, calibrate the junction model to represent existing operational conditions, it is considered necessary to undertake a manual assessment of the junction and to validate/calibrate the individual junction model using queue and traffic flow data collected in 2025.
- 2.1.9. In order to provide NH with further comfort on distribution, a manual Census 2011 Method of Travel to Work distribution has been undertaken of the proposed development traffic following NH's query of the level of anticipated traffic expected to reach the junction.
- 2.1.10. This note provides a manual (calibrated) assessment of the junction, alongside a separate merge/diverge assessment and review of highway safety at the junction. We have also considered the proposed mitigation schemes at the southern roundabout.

3. HIGHWAY SAFETY

- 3.1.1. A review of Personal Injury Accident Data (PIAs) at the A2/Wrotham Road junction has been undertaken using data obtained directly from KCC for the most recent five years of available data from 1st January 2021 to 31st December 2025.
- 3.1.2. The PIA data is summarised in Table 1 and included in detail at Appendix C.

Table 1 - Personal Injury Accident Data (01/01/2021 – 31/12/2025)

LOCATION	SEVERITY		
	Slight	Serious	Fatal
A2 Mainline EB	6	0	0
A2 Mainline WB	4	1	0
A2 EB Off slip	1	0	0

LOCATION	SEVERITY		
	Slight	Serious	Fatal
A2 WB Off slip	5	1	0
A2 EB On slip	0	1	0
A2 WB On slip	0	0	0
Wrotham Road (South)	2	0	0
Wrotham Road (North)	3	0	0
Internal Links	1	0	0
Northern Roundabout Circulatory	2	1	0
Southern Roundabout Circulatory	2	0	0
TOTAL	26	4	0

- 3.1.3. The results show that there has been a total of 30 PIAs over the most recent five-year period for which data is available, 26 of which were classified as 'Slight' and 4 classified as 'Serious'.
- 3.1.4. The highest volume of PIAs has been recorded on the A2 mainline; 6 in the eastbound direction and 5 in the westbound direction (10 classified as 'Slight' and 1 classified as 'Serious'). From interrogation of the PIA details, these appear to be as a result of driver error with the majority resulting in rear-end shunts following poor observation of upcoming traffic.
- 3.1.5. There has been a total of 6 PIAs recorded on the A2 WB off slip, 5 of which have been classified as 'Slight' and 1 which has been classified as 'Serious'. Again, the majority of these PIAs occurred as a result of driver error not observing traffic on the slip road. Notably, PIA 26 appears to be caused by a bike throttle being stuck causing the driver to lose control and PIA 27 details that the offending driver failed a breath test and was arrested for drink driving.
- 3.1.6. Two PIAs were recorded (13 and 15) on the Wrotham Road approach to the southern roundabout and both were detailed as rear end shunts. Notably, the details recorded for PIA 15 indicates that the driver was using their phone prior to colliding with the rear of the other vehicle in question.
- 3.1.7. The 'Serious' PIA on the northern roundabout appears to be as a result of a driver mistiming their entry into the circulatory carriageway from the internal link road and colliding with a vehicle already on the circulatory. The remaining 'Serious' PIA which occurred on the A2 EB on slip was due to a motorcycle towing

another motorcycle via a tow rope. The tow rope snapped causing the towed motorcycle to fall and injure the pillion passenger.

- 3.1.8. Whilst all PIAs are regrettable, the volume and pattern of incidents recorded do not give any undue cause for concern, with the data suggesting that the majority of accidents have been caused by driver error rather than the layout and marking of the highway.
- 3.1.9. The level of development traffic that is forecast to pass through the A2/Wrotham Road junction is negligible in comparison to the level of traffic already using the junction, as demonstrated in Section 4 of this report. As a result, the proposed development will not have an unacceptable impact on highway safety at the A2/Wrotham Road junction.

4. TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

4.1. Trip Generation

- 4.1.1. Trip rates and subsequent trip generation was agreed with KCC at the scoping stage of the project. Their scoping response is provided at Appendix D.
- 4.1.2. The industry standard TRICS 7.11.4 database has been used to determine the potential vehicle trip generation for the proposed development.
- 4.1.3. The following parameters were used within the assessment:
- Land Use – Residential, Houses Privately Owned.
 - Regions – United Kingdom (Excl. Greater London and Ireland).
 - Unit Range – 100-140 (Selected Average: 121).
 - Date Range – 01/01/2016 – 23/05/2024.
 - Locations – Suburban Area, Edge of Town.
 - Surveys undertaken during the Covid-19 pandemic were removed.
- 4.1.4. The trip rates and subsequent trip generation are summarised in Table 2, with the TRICS output provided at Appendix E.

Table 2 - TRICS Trip Generation Assessment - 120 Dwellings

PEAK PERIOD	TRIP RATE (PER DWELLING)		VEHICLE TRIPS (120 DWELLINGS)		TWO-WAY TOTAL
	IN	OUT	IN	OUT	
AM	0.156	0.355	19	43	62
PM	0.332	0.187	40	22	62

N.B. Figures subject to rounding

- 4.1.5. The trip generation summarised in Table 2 indicates that the proposed development is forecast to generate 62 two-way vehicle trips in the AM peak, and 62 two-way vehicle trips in the PM peak.

4.2. Distribution and Assignment

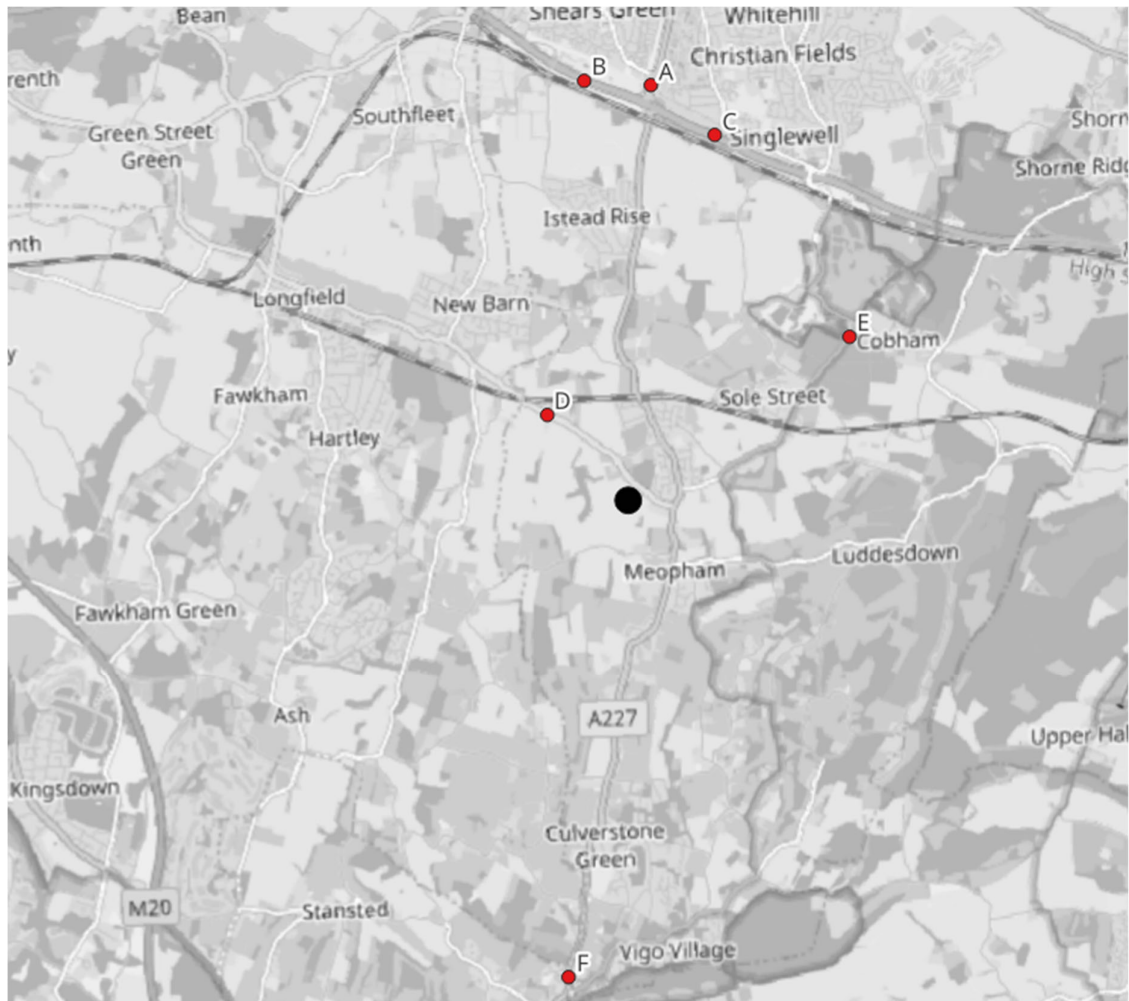
GTM Distribution

- 4.2.1. As previously stated, KCC have requested the use of the GTM to distribute and assign the proposed development traffic. This was done based on two similar nearby residential zones within the model near to the site.
- 4.2.2. As previously stated, further information on the distribution and assignment of development traffic within the GTM model will be provided in due course once this has been received from Jacobs.

Census Distribution

- 4.2.3. Manual distribution has been undertaken for the proposed development as part of this sensitivity assessment using Census 2011 Method of Travel to Work data.
- 4.2.4. The distribution has been undertaken at the MSOA level using Gravesham 012 as the place of origin using. The distribution zones are presented within Figure 2 and summarised as follows.

Figure 2 - Distribution Zones



- Zone A – A227 North

- Zone B – A2 West
- Zone C – A2 East
- Zone D – B260
- Zone E – Sole Street (via Green Lane)
- Zone F – A227 South

4.2.5. The Census distribution assessment is detailed at Appendix F and the resulting traffic flow diagrams are provide at Appendix G.

4.2.6. Traffic was assigned onto the network using Google maps routing tool between the location of the site access on Longfield Road and the destinations within the Census 2011 Method of Travel to Work data.

4.2.7. Based on the distribution and assignment exercise, the level of development traffic expected to reach the distribution zones are summarised in Table 3.

Table 3 - Development Traffic Distribution

DISTRIBUTION ZONE	DISTRIBUTION PROPORTION (%)	TWO WAY TOTAL	
		AM PEAK	PM PEAK
A227 North	15%	9	9
A2 West	38%	24	24
A2 East	14%	9	9
B260	17%	11	11
Sole Street (Via Green Lane)	2%	1	1
A227 South	14%	9	9

N.B. Figures subject to rounding

4.2.8. As can be seen from the distribution exercise, 67% of vehicle traffic is anticipated to reach the A2/Wrotham Road junction. This equates to vehicle trips in the region 42 two-way vehicles across both peak periods

4.2.9. The census distribution and assignment exercise forecasts minimal levels of traffic routing through other junctions on the SRN. All remaining assigned traffic (20 two-way vehicles), should they reach other SRN junctions, will create an imperceptible impact on their operation.

5. TRAFFIC IMPACT

5.1. Merge/Diverge Assessment

- 5.1.1. In the absence of information from Jacobs, a manual Merge/Diverge assessment has been undertaken of the northern and southern roundabout on/off slips. This has been undertaken in accordance with CD 122.
- 5.1.2. As part of the application for the former Tollgate Hotel, it was agreed with NH that WebTris data could be used to inform the mainline flow on the A2 using count points A2/8374B (westbound) and A2/8375A (eastbound). To provide a suitable baseline, they utilised an average of Tuesday to Thursday flows through October (avoiding half term week) as these will be less impacted by flexible working patterns.
- 5.1.3. This approach has also been adopted for this assessment to ensure consistency on what has historically been agreed, albeit the use of data from November 2025 as opposed to October in order to avoid the half term week. The raw data is provided in Appendix H.
- 5.1.4. To inform the flows on the on slip and off slips at the junction, turning counts from a Manual Classified Turning Count (MCC) survey have been used. The MCC was undertaken at the A2/Wrotham Road junction on Wednesday 12th March 2025 which recorded vehicle volume, classification and queue data. This is included in Appendix I.
- 5.1.5. The locations of both WebTris sites are situated within the dumbbell arrangement (after the off slips and before the on slips) and therefore acts as the respective upstream and downstream mainline flows for both the merge and diverge assessments.
- 5.1.6. To demonstrate the highest impact, the flows have been uplifted to the 2042 Local Plan year using TEMPro factors plus the committed development traffic to assess the full impact of the proposed development. Further information on the committed development traffic is provided later in this section.
- 5.1.7. The relevant merge/diverge graphs and calculations are provided in Appendix H and the flows are summarised in Table 4.

Table 4 - Merge/Diverge Assessment of A2/Wrotham Road junction

MERGE/DIVERGE LOCATION	FLOW	AM PEAK	PM PEAK	REQUIRED FORM OF LAYOUT	
				AM	PM
2042 LOCAL PLAN + COMMITTED DEVELOPMENT					
A2 WB on slip	Merge Flow	1066	802	D	A
	Mainline Flow	5757	4870		
A2 WB off slip	Diverge Flow	750	730	C	A
	Mainline Flow	5757	4870		

MERGE/DIVERGE LOCATION	FLOW	AM PEAK	PM PEAK	REQUIRED FORM OF LAYOUT	
				AM	PM
A2 EB on slip	Merge Flow	734	6158	B	D
	Mainline Flow	4079	795		
A2 EB off slip	Diverge Flow	1045	6158	C	D
	Mainline Flow	4079	1415		
2042 LOCAL PLAN + COMMITTED + DEVELOPMENT					
A2 WB on slip	Merge Flow	1082	811	D	A
	Mainline Flow	5757	4870		
A2 WB off slip	Diverge Flow	752	736	C	A
	Mainline Flow	5757	4870		
A2 EB on slip	Merge Flow	740	799	B	D
	Mainline Flow	4079	6158		
A2 EB off slip	Diverge Flow	1052	1430	C	D
	Mainline Flow	4079	6158		

5.1.8. Based on the manual distribution, the proposed development will create an additional 16 vehicles heading to the westbound on slip in the AM peak and 9 vehicles in the PM peak. There will also be an additional 6 vehicles heading to the eastbound on slip in the AM peak and 3 vehicles in the PM peak.

5.1.9. The proposed development will also create an additional 7 vehicles using the eastbound off slip and 3 vehicles using the westbound off slip in the AM Peak. In the PM peak there will be an additional 15 vehicles using the eastbound off slip and 6 using the westbound off slip.

5.1.10. The level of additional trips associated with the development at this junction and merge/diverge slip roads is negligible. As demonstrated in Table 4, the addition of the proposed development traffic does not create a step change in layout requirements, as defined by the criteria set out in DMRB CD 122.

5.2. Junction Assessments

GTM Future Year Scenarios

- 5.2.1. The assessment scenarios included within the GTM model are as follows:
- 2032 Reference Case
 - 2042 Local Plan
- 5.2.2. It was stated by Jacobs that a committed development list was requested from Gravesham Borough Council (GBC), however this was not provided. To avoid delay in the modelling process, Jacobs suggested the use of TEMPro growth factors for the 2032 Reference Case scenario which was agreed with KCC. No further committed developments were added to this in order to avoid double counting.
- 5.2.3. At the time of writing, Richborough are also preparing a planning application for a proposed residential development of up to 350 dwellings on land east of Wrotham Road (Planning Ref: 20250992), to the east of the proposed development, also supported by Ridge and Partners LLP.
- 5.2.4. Whilst both proposals are being progressed as separate planning applications, at the request of the LHA, the Transport Assessment for each development has considered the potential cumulative impact of each. In this instance, the proposed development site has recently been given Regulation 19 status, whilst land east of Wrotham Road has no current planning status.
- 5.2.5. The full model turning flows have been provided to NH in a separate email due to the file size. The scenarios tested within the model are the following:
- Scenario 1 – 2042 Local Plan
 - Scenario 2 – 2042 Local Plan + Site 1
 - Scenario 3 – 2042 Local Plan + Site 2
 - Scenario 4 – 2042 Local Plan + Site 1 + Site 2
 - Scenario 5 – 2032 Reference Case
 - Scenario 6 – 2032 Reference Case + Site 1
 - Scenario 7 – 2032 Reference Case + Site 2
 - Scenario 8 – 2032 Reference Case + Site 1 + Site 2
- 5.2.6. For clarity, Land east of Wrotham Road is referred to as Site 1 and the proposed development is referred to as Site 2.

TEMPro (Sensitivity Assessment)

- 5.2.7. For the purpose of this sensitivity assessment, in order to forecast future traffic growth, the turning flows from the MCC were uplifted using NTM adjusted growth factors obtained from TEMPro for the AM and PM peak periods.
- 5.2.8. The factors were generated for the Gravesham 012 MSOA using the Core model for car driver only. The resulting factors are presented in Appendix G.
- 5.2.9. The proposed development and future committed development numbers were deducted from the future year forecast calculations to avoid double counting.

Validation and Calibration

- 5.2.10. The A2/Wrotham Road junction complex has been modelled using the ARCADY module of Junctions 11 as a linked roundabout.
- 5.2.11. Both the A2 off slip roads have been modelled as entry only, and the two on slips modelled as exit only.
- 5.2.12. The junction measurements are included in Appendix J. For transparency, slight adjustments have been made to some dimensions from those presented within the final TA following review.
- 5.2.13. Given the GTM is strategic in nature, no junction queue data was provided by Jacobs. Therefore, the junction model could not be validated or calibrated. Given the model assumes rerouting of trips based on future conditions, the flows are not necessarily reflective of a calibrated model based on current conditions.
- 5.2.14. On that basis, this sensitivity assessment considers the MCC observed average and 95th percentile queue data to validate/calibrate the model for the 2025 base year. The data is summarised in Table 5 and also summarised at the end of Appendix I.

Table 5 - Observed Average and 95th Percentile Queue Data (2025)

	NORTHERN ROUNDABOUT			SOUTHERN ROUNDABOUT		
	WROTHAM ROAD (N)	LINK ROAD	A2 EB OFF SLIP	LINK ROAD	A2 WB OFF SLIP	WROTHAM ROAD (S)
AM PEAK						
Average Queue	9	0	12	0	20	11
95 th Percentile Queue	17	0	18	0	31	15
PM PEAK						
Average Queue	11	0	20	0	14	9
95 th Percentile Queue	19	0	36	0	27	14

- 5.2.15. The 2025 base model was run uncalibrated and compared to the average and 95th queues observed as part of the MCC survey. The results of the uncalibrated model are presented in Table 6 and included at Appendix K.

Table 6 - Uncalibrated 2025 Base Model

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
2025 BASE YEAR (UNCALIBRATED)							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.48	1	3	0.45	1	3
	A2 (W) Off slip	0.58	1	5	0.72	3	7
	Wrotham Road (N)	0.85	6	13	0.79	4	9
Southern Roundabout (2)	A2 (E) Off slip	0.71	3	12	0.64	2	9
	Wrotham Road (S)	0.85	5	20	0.67	2	9
	Wrotham Road (N) Internal Link	0.55	1	3	0.51	1	3

- 5.2.16. As demonstrated from the observed queue data, there is sustained queuing on both off slips during both peak periods, and to a lesser extent on Wrotham Road North and South.
- 5.2.17. On the A2 WB off slips, drivers are signed to use both lanes to turn left to Wrotham Road north. However, it appears that drivers may not be using both lanes to undertake this manoeuvre. There is also an atypical give-way arrangement with hard segregation which forces drivers directly onto the exit arm as opposed to the circulatory, causing drivers to look over their shoulder and be more cautious.
- 5.2.18. Similarly, queuing is currently observed on the A2 WB off slip. At present, the off slip is largely one lane along with a hard shoulder lane until it flares out at the circulatory for c.5 vehicles length. There is a high right turn flow which is likely creating an element of lane starvation for the left turn lane. It was also noted with NH's response that they are aware of queueing on this off slip.
- 5.2.19. To more accurately reflect the current operation of these arms and to allow for a robust consideration of development impact, saturation intercept adjustments have been cautiously applied to arm 1-3 (A2 EB off slip) of -350 and on arm 2-1 (A2 WB off slip) of -250 to be within a more suitable range of the observed average and 95th percentile queue data.
- 5.2.20. The results for the other arms are more representative of the observed conditions based on geometry alone and therefore no adjustments have been made to these.
- 5.2.21. The results of the calibrated model are presented in Table 7 and included at Appendix K.

Table 7 - Calibrated 2025 Base Model

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
2025 BASE YEAR (CALIBRATED)							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.47	1	3	0.45	1	3

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
	A2 (W) Off slip	0.71	3	9	0.88	7	19
	Wrotham Road (N)	0.85	6	13	0.79	4	9
Southern Roundabout (2)	A2 (E) Off slip	0.93	10	52	0.83	4	24
	Wrotham Road (S)	0.84	5	20	0.67	2	9
	Wrotham Road (N) Internal Link	0.55	1	3	0.51	1	3

Committed Development

- 5.2.22. In their response, NH have requested that the following sites be included as committed development within the junction assessment:
- Former Tollgate Hotel, Gravesend – Electric Vehicle (EV) ChargePoint facility with ancillary sales building, small retail facility and 12-pump fuel station (Planning Ref: 20240856)
 - Land at Coldharbour Road – 400 residential units (Ref: 2014214)
- 5.2.23. The trip generation for each site has been reviewed from their respective assessments.
- 5.2.24. At the time of writing, a significant proportion of Land at Coldharbour Road has already been built out and the traffic flows associated with the level of development will have been collected within the 2025 MCC surveys.
- 5.2.25. This was also noted within the Transport Assessment addendum for the former Tollgate Hotel, dated 24th October 2024 (Doc number: TAA01) following interrogation of the committed development list provided by GBC in September 2024. This indicated that of the 400 units, 164 remained to be built out. This was ‘acknowledged’ by NH in their response dated 12th November 2024 (NH Ref: NH/24/08483) and raised no further comments.
- 5.2.26. These vehicle trips for Land at Coldharbour Road were subsequently included within the modelling assessment of the A2/Wrotham Road junction and are included within Appendix E of the addendum report for the former Tollgate Hotel. These have been used within this assessment.
- 5.2.27. Similarly, the development trips for the former Tollgate Hotel are provided in Appendix G of the original Transport Assessment (Doc Ref: TA01) and have also been included within this assessment. This assumes some rerouting of existing trips on the network to use the facility which has also been reflected within our assessment in the future years. The flows used are also included within the traffic flow diagram in Appendix G of this note.
- 5.2.28. Land at Coldharbour Road is likely to be built out prior to the opening year of the proposed development. Similarly, the opening year modelled for the former Tollgate Hotel is 2028 and is therefore also likely to be operational prior to the opening year of the proposed development. On that basis, the committed development is included as an assessment scenario for both the 2032 and 2042 future years.

- 5.2.29. It should also be noted that the remaining number of units to be built at Land at Coldharbour Road is likely to be less than 164 given the time that has elapsed. Therefore, this provides a robust assessment of the junction.

Modelling Scenarios Assessed

- 5.2.30. The modelling scenarios for the assessment of the junction are outlined in Table 8 and have been assessed for the development AM (08:00-09:00) and PM (17:00-18:00) peak periods.
- 5.2.31. For ease of comparison, the future years in this sensitivity assessments are referred to as the same as those included within the GTM, i.e. Reference Case and Local Plan.

Table 8 - Junction Assessment Scenarios

GTM	SENSITIVITY ASSESSMENT
2032 Reference Case	2026 Base
2032 Reference Case + Development	2032 Reference Case
2042 Local Plan	2032 Reference Case + Committed Development
2042 Local Plan + Development	2032 Reference Case + Committed + Development
	2042 Local Plan
	2042 Local Plan + Committed Development
	2042 Local Plan + Committed + Development

A2/Wrotham Road Junction ARCADY Results (Sensitivity Assessment)

- 5.2.32. The results of the sensitivity assessment are summarised in Table 9 and included at Appendix K.

Table 9 – A2/Wrotham Road ARCADY Results (Sensitivity Assessment)

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
2026 BASE YEAR							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.48	1	3	0.46	1	3

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
	A2 (W) Off slip	0.72	3	9	0.90	8	21
	Wrotham Road (N)	0.86	6	14	0.80	4	10
	Former Tollgate Hotel	0.00	0	0	0.00	0	0
Southern Roundabout (2)	A2 (E) Off slip	0.95	12	62	0.84	5	26
	Wrotham Road (S)	0.86	6	23	0.68	2	9
	Wrotham Road (N) Internal Link	0.56	1	3	0.51	1	3
2032 REFERENCE CASE							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.48	1	3	0.46	1	3
	A2 (W) Off slip	0.74	3	10	0.91	9	23
	Wrotham Road (N)	0.88	7	16	0.80	4	10
	Former Tollgate Hotel	0.00	0	0	0.00	0	0
Southern Roundabout (2)	A2 (E) Off slip	0.98	16	76	0.85	5	28
	Wrotham Road (S)	0.88	6	25	0.69	2	9
	Wrotham Road (N) Internal Link	0.57	1	4	0.52	1	3
2032 REFERENCE CASE + COMMITTED DEVELOPMENT							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.49	1	3	0.48	1	3
	A2 (W) Off slip	0.77	3	11	0.99	22	55
	Wrotham Road (N)	0.91	10	22	0.85	5	13
	Former Tollgate Hotel	0.60	2	46	0.57	1	36
Southern Roundabout (2)	A2 (E) Off slip	1.11	46	184	0.93	10	48
	Wrotham Road (S)	0.91	9	33	0.72	3	11
	Wrotham Road (N) Internal Link	0.59	2	4	0.53	1	3
2032 REFERENCE CASE + COMMITTED + DEVELOPMENT							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.49	1	3	0.49	1	3
	A2 (W) Off slip	0.77	4	11	1.00	27	64
	Wrotham Road (N)	0.92	10	23	0.86	6	14

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
	Former Tollgate Hotel	0.62	2	50	0.60	1	40
Southern Roundabout (2)	A2 (E) Off slip	1.12	49	197	0.95	11	57
	Wrotham Road (S)	0.94	11	41	0.73	3	11
	Wrotham Road (N) Internal Link	0.60	2	4	0.54	1	3
2042 LOCAL PLAN							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.49	1	3	0.49	1	3
	A2 (W) Off slip	0.79	4	12	0.99	24	57
	Wrotham Road (N)	0.94	13	28	0.86	6	14
	Former Tollgate Hotel	0.00	0	0	0.00	0	0
Southern Roundabout (2)	A2 (E) Off slip	1.11	46	187	0.95	12	57
	Wrotham Road (S)	0.95	12	45	0.76	3	12
	Wrotham Road (N) Internal Link	0.60	2	4	0.55	1	3
2042 LOCAL PLAN + COMMITTED DEVELOPMENT							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.49	1	3	0.50	1	3
	A2 (W) Off slip	0.81	5	14	1.07	63	130
	Wrotham Road (N)	0.98	21	44	0.90	8	20
	Former Tollgate Hotel	0.80	3	99	0.71	2	63
Southern Roundabout (2)	A2 (E) Off slip	1.24	87	339	1.02	24	104
	Wrotham Road (S)	0.97	17	60	0.78	3	13
	Wrotham Road (N) Internal Link	0.63	2	4	0.56	1	3
2042 LOCAL PLAN + COMMITTED + DEVELOPMENT							
Northern Roundabout (1)	Wrotham Road (S) Internal Link	0.50	1	3	0.50	1	3
	A2 (W) Off slip	0.82	5	14	1.08	70	142
	Wrotham Road (N)	0.98	23	47	0.91	9	21
	Former Tollgate Hotel	0.83	3	111	0.74	2	73
	A2 (E) Off slip	1.26	91	356	1.05	29	123

JUNCTION (NO.)	APPROACH	AM PEAK 08:00 – 09:00			PM PEAK 17:00-18:00		
		RFC	QUEUE (PCU)	DELAY (S)	RFC	QUEUE (PCU)	DELAY (S)
Southern Roundabout (2)	Wrotham Road (S)	1.00	23	75	0.78	4	14
	Wrotham Road (N) Internal Link	0.63	2	4	0.56	1	3

- 5.2.33. The results of the sensitivity assessment demonstrate that the junction is operating at or close to capacity on more than one arm at each junction in both peak hours. As a result, with additional future year growth, the junction complex is forecast to operate beyond capacity in all future years.
- 5.2.34. The proposed development has a negligible impact on the junction compared to the 2032 reference case + committed development scenario. At the southern roundabout, queuing increases by 3 PCUs on the A2 WB off slip and by 2 PCUs on Wrotham Road South. Delays increase by 13 seconds and 8 seconds, respectively. There is little impact at the northern roundabout within the AM peak.
- 5.2.35. In the PM peak, the highest development impact is at the northern roundabout with the highest increase in queueing of 5 PCUs on the A2 EB off slip and subsequent delay increase of 9 seconds. Again, this is not considered to be a significant impact.
- 5.2.36. In the 2042 Local Plan + Committed + Development scenario, the proposed development impact is again expected to be negligible. In the AM Peak at the southern roundabout, queueing increases by 4 PCUs on the A2 WB off slip and by 6 PCUs on Wrotham Road south with subsequent delay increase of 17 and 15 seconds, respectively.
- 5.2.37. In the PM peak, queueing increases by 7 PCUs on the A2 EB off slip, and by 5 PCUs on the WB off slip. Delay increases by 12 and 19 seconds, respectively.
- 5.2.38. Overall, the level of development impact on the A2/Wrotham Road junction is minimal. The model results are considered to be robust given the manual assessment does not consider any rerouting away from the junction in the future years as the junction becomes more congested with background traffic growth and committed development traffic added.
- 5.2.39. The Travel Plan targets an 8% modal shift from private car use following contributions towards improving bus services and other sustainability measures. Therefore, the forecast level of proposed development vehicle trips are likely to be less than what has been modelled.
- 5.2.40. It should be noted that in the future years, the queuing on the A2 EB off slip does not exceed the storage capacity of the arm (c.226 PCUs across both lanes) and therefore does not create a safety issue in relation to queueing back to the A2 mainline. Similarly, queuing on Wrotham Road N does not exceed the storage capacity (c.67 PCUs) of the link between the roundabout and the Wrotham Road/Coldharbour Road roundabout to the north.

5.3. Junction Mitigation Assessments

- 5.3.1. As previously stated, we have been made aware by NH of two current mitigation schemes as part of the two committed developments. These include:

- 'Interim' Mitigation scheme (Road marking adjustments) – Former Tollgate Hotel;

- 'Final' Mitigation Scheme (Signalisation) – Land at Coldharbour Road.

- 5.3.2. Both schemes are focused on the southern roundabout and are largely for safety as much as they are for capacity. Both schemes focus on improving the operation of the A2 WB off slip given the level of queueing forecast for the future year.
- 5.3.3. As demonstrated from the modelling work undertaken, queueing is expected to exceed the storage capacity of the off slip (c.60 PCUs) in the 2042 future year with committed development traffic.
- 5.3.4. It is unclear when the 'Final' mitigation scheme will come forward and it is understood this will be done so once a certain level of dwellings has been built for Land at Coldharbour Road. It is unclear whether this threshold has been met. In reality, it is likely that this scheme will be in place prior to the proposed development opening year.
- 5.3.5. No mitigation schemes are proposed for the northern roundabout.

'Interim' Mitigation Scheme

- 5.3.6. The 'Interim' mitigation scheme proposed as part of the Former Tollgate Hotel application within Drawing 22052-MA-XX-DR-C-0102 P07 focuses on changes to the road marking on the off slip approach by signing both lanes for left turners and provided a two-lane designation on the circulatory. No alterations are proposed to the dimensions of the circulatory or approach arms.
- 5.3.7. The core ARCADY model does not account for lane designation and instead models based on the full width and use of the entry arm. The intercept values applied to the calibrated model accounts for the existing operation of the junction and therefore restricts the level of demand able to exit the off slip. In reality, the proposed measures are likely to alter driver behaviour on approach to the circulatory and utilise both approach lanes. This is therefore likely to improve junction operation, in reality.

'Final' Mitigation Scheme

- 5.3.8. The 'Final' mitigation scheme includes the signalisation of the A2 WB off slip, and southbound circulatory arm. This includes filling in the northern section of the roundabout to stop 'U-turners'.
- 5.3.9. NH stated in their response that the approved scheme is included in Drawing 684437CH-JAC-A2-HGN-DR-1200-001 Rev P01, however this could not be identified on the Gravesham Planning portal. Instead, an early version of the scheme was identified (Drawing No. PHCOLDHARBOURD.1/01).
- 5.3.10. However, it appears that the approved scheme has been modelled as part of the Former Tollgate Hotel application within a technical note (Doc ref: TN01) albeit we are unsure whether this was accepted by NH. Using both the early version of the design and the LinSig model output, an assessment of the scheme has been undertaken.
- 5.3.11. Some minor amendments to the scheme have been made in order to accommodate traffic in all future scenarios. These include:
 - Give way saturation flow for arm 3 in the LinSig is based on the intercept value within the ARCADY model. This saturation flow is 1966. As ARCADY inputs represent the full flared multilane stop line, the LinSig utilises these values applied to a single lane.
 - Pedestrian crossing added to phasing over the A2 WB off slip.
 - Right turn radii updated on arm 1 and arm 2 to represent roundabout entry radii.

- Increase in cycle time in the 2042 Local Plan scenarios in the AM peak to 60s.

5.3.12. The results of the proposed mitigation scheme modelling are summarised in Table 10 with the full outputs included at Appendix K.

Table 10 - Southern Roundabout Signalisation Mitigation

APPROACH	AM PEAK 08:00-09:00			PM PEAK 17:00-18:00		
	DOS (%)	MMQ (PCUS)	DELAY (S/PCU)	DOS (%)	MMQ (PCUS)	DELAY (S/PCU)
	2032 REFERENCE CASE					
Internal Link (N)	79%	9	20	77%	8	21
A2 WB off slip	81%	6	26	73%	5	22
Wrotham Road (S)	75%	4	7	59%	2	4
Cycle Time (s)	45			45		
PRC (%)	11%			18%		
Delay (PCU/Hr)	13			11		
2032 REFERENCE CASE + COMMITTED DEVELOPMENT						
Internal Link (N)	86%	12	25	77%	8	21
A2 WB off slip	87%	8	31	77%	6	23
Wrotham Road (S)	79%	5	9	61%	3	4
Cycle Time (s)	45			45		
PRC (%)	4%			17%		
Delay (PCU/Hr)	16			11		
2032 REFERENCE CASE + COMMITTED + DEVELOPMENT						

Internal Link (N)	86%	12	25	79%	9	22
A2 WB off slip	87%	8	31	78%	6	24
Wrotham Road (S)	82%	5	10	62%	3	4
Cycle Time (s)	45			45		
PRC (%)	4%			13%		
Delay (PCU/Hr)	17			12		
2042 LOCAL PLAN						
Internal Link (N)	84%	11	23	81%	9	23
A2 WB off slip	86%	7	30	78%	6	24
Wrotham Road (S)	83%	6	10	65%	3	4
Cycle Time (s)	45			45		
PRC (%)	5%			11%		
Delay (PCU/Hr)	16			12		
2042 LOCAL PLAN + COMMITTED DEVELOPMENT						
Internal Link (N)	90%	17	32	81%	9	23
A2 WB off slip	87%	10	33	82%	6	26
Wrotham Road (S)	88%	9	20	67%	3	5
Cycle Time (s)	60			45		
PRC (%)	0%			10%		

Delay (PCU/Hr)	22			13		
2042 LOCAL PLAN + COMMITTED + DEVELOPMENT						
Internal Link (N)	87%	15	28	84%	10	25
A2 WB off slip	89%	11	37	83%	7	26
Wrotham Road (S)	90%	10	19	68%	3	5
Cycle Time (s)	60			45		
PRC (%)	0%			7%		
Delay (PCU/Hr)	22			14		

- 5.3.13. The model demonstrates that the proposed signalisation is able to cater for the proposed development on top of the committed development schemes and background traffic growth.
- 5.3.14. Again, the impact of the proposed development on the southern roundabout is negligible when compared to the future years with committed development traffic.

6. SUMMARY AND CONCLUSION

- 6.1.1. The sensitivity assessment undertaken within this technical note demonstrates that proposed development will have a negligible impact on capacity and will not have an unacceptable impact on safety at the A2/Wrotham Road junction complex.
- 6.1.2. The merge/diverge assessment undertaken demonstrates that the addition of the proposed development traffic does not create a step change in layout requirements, as defined by the criteria set out in DMRB CD 122.
- 6.1.3. The modelling undertaken demonstrates that the manual assessment of the A2/Wrotham Road junction better reflects the existing operation of the junction following calibration against observed queue data. This more accurately models existing and future queueing and delay which is not reflected otherwise.
- 6.1.4. The manual assessment considers a larger level of proposed development traffic routing through the junction compared to the GTM flows. The manual assessment also does not consider any rerouting which could take trips away from the junction and improve performance.
- 6.1.5. On that basis, the manual assessment is considered to be robust, and it demonstrates that the impact of the proposed development will be negligible. Nonetheless, the proposed future signalisation of the junction will ensure that the southern roundabout will continue to operate within acceptable levels.

- 6.1.6. The northern roundabout may require mitigation given its forecast operation in future years. However, any capacity issues at the junction are not caused by the proposed development, which has a negligible impact, and therefore no mitigation is proposed at this location.
- 6.1.7. In conclusion, the assessment work undertaken and detailed in this report demonstrates that, in accordance with NPPF paragraph 116, the residual cumulative impact on the road network would not be severe and there would not be an unacceptable impact on highway safety.

